protein (CSP). Biting behavior, parity rate, vectorial capacity and entomological inoculation rate was compared between seasons and location within the village. Results are discussed in the context of the malaria transmission dynamics in Kong Mong Tha.

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MORPHOLOGICAL VARIATIONS AMONG *ANOPHELES MINIMUS* A IN MAESOT DISTRICT, TAK PROVINCE, THAILAND

Jaichapor B, Jones JW and Sithiprasasna R

Anopheles minimus Theobald is one of the major vectors of malaria throughout the Oriental Region. Its complex is known to comprise at least 2 sibling species (A and C) in Thailand. This study investigated the specific status of *An. minimus* from Ban Khun Huay, Ban Pa Dae and Ban Tham Seau, Maesot District, Tak Provice, Thailand. Anopheline larvae were collected between October 2002 and September 2003 and allowed to emerge into adults under laboratory conditions. Adult *An. minimus* were then identified by morphological and molecular characterization. From morphological techniques, we observed that 1,715 of female *An. minimus* could be separated into 8 groups based on their wing scale patterns. Sampling from each group was then confirmed by molecular technique. Polymerase Chain Reaction Restriction Fragment Length Polymorphism (PCR-RFLP) assay developed by Van Bortel et a1 (1999) was used for the identification of *An. minimus* group. We conclude that all samples were in fact *An. minimus* A.

Abstract of the Joint International Tropical Medicine Meeting (JITMM). Bangkok, Thailand. 29 November-1 December 2004:229. (Poster)

NEW WAYS TO SCREEN CANDIDATE MOSQUITO REPELLENTS FOR HUMAN USE

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The insect/arthropod threat to a human can be both a nuisance and a source of disease. Personal protection by repellents is an effective and practical way to reduce biting activity of hemophagous arthropods especially when vaccines are not available. DEET, a synthetic broad spectrum repellent, has been widely used. Recent research has shown that DEET is not effective against some species of insect/arthropod vectors. Despite the broad spectrum effectiveness of DEET and the improvement in persistence and acceptability as a result of controlled-release formulation, the threat of insect-borne disease is still so grave as to demand continuing effort to develop innovative repellent/repellent formulations which may be more effective than DEET for some species of insect/arthropod vectors. We investigated the new candidate insect repellent: DM 159-2 by *in vitro* and *in vivo* methods against *An. dirus* A, *Ae. aegypti*, and *Ae. albopictus*

colonies at AFRIMS. A modified K & D module was designed and protocols for use of the module was developed to quantify mosquito biting responses *in vitro*. Dose-response assays were conducted against the three species using DEET and DM159-2. Estimated dose response proportions of repelled mosquitoes were compared to data estimates obtained using *in vivo* human volunteer assays. Feeding percentages are transformed to the prohit, and repellent dosages are transformed into the logarithmic scale. Effective concentration to repel 50% and 95% tested mosquito population are then calculated by method of Goldstein for single curve with graded responses. Results will be discussed.

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NUTRITION ACCUMULATION AND SURVIVAL RATE OF FEMALE *ANOPHELES DIRUS* (DIPTERA: CULICIDAE)

Khongtak P, Jones JW, Tornee S, Arthan D and Sithiprasasna R

Blood is essential for egg production of an autogenous female mosquito since egg production is dependent on blood feeding, and blood meal protein is the prime nutrition source for egg formation. *An. dirus* is the most dominant of human malaria in Thailand, it maintains feeding duality that includes vertebrate blood meals for egg production and sugar meals from plants for the synthesis of flight and survival with energy reserve. Characteristic of adult Diptera is that carbohydrate is the sole energy for flight and lipid is the energy source. When at rest, sugar leads to the deposition of glycogen, lipid in the fat body, and glycogen in the flight muscle. In order to investigate the nutrition accumulation pattern among mosquitoes feeding on 1) sugar only, 2) blood only, 3) blood and sugar, and 4) water only, we observed the survival rate of the mosquitoes with various diets and studied the relationship between each diet against their sizes and survival rate. After laboratory *An. dirus* were reared at different density (50/pan and 500/pan) to produce small and large size adults, we then determined the amount of glycogen, lipid, and sugar in female. Wing length measurement and assays on glycogen, sugar, and lipid were performed on a daily basis for the whole life-time. Since the lipid, sugar, and glycogen content of a single mosquito can be estimated by colorimetric method, sugar content was determined by the anthrone method while the glycogen content was measured by the anthrone method after separation of glycogen with sodium sulphate. Lipid content was determined by extraction of total lipid with chloroform-methanol, conversion of unsaturated lipids to sulfonic acid derivatives, and assay by vanillin-phosphoric acid reagent, respectively. Results and analysis will he discussed.

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